

151 PIERS

A pier is a structure that extends out from shore into navigable water and is designed for the berthing of vessels for repair, fueling, and other essential services, such as fresh water, electric power, compressed air, waste disposal and communications facilities. A pier is oriented either perpendicular to or at an angle with the shore and normally accommodates berthing on both sides for its entire length although there are instances where only one side is used because of site conditions or because there is no need for additional berthing space. Code 151 includes all piers regardless of function served, protective dolphins at pier heads, original dredging performed specifically for the purpose of providing the pier facility, all trackage on the pier, and all supporting utilities and services.

Piers provide a transfer point for cargoes and/or passengers between water carriers and land transport. Separate facilities should be maintained where service involves large volumes of both cargo and passengers. Where one service is subsidiary to another, consideration should be given to the feasibility of accommodating both services at one facility.

In countries outside the United States, a pier is often referred to as a jetty, or a mole when of solid fill construction, and a wharf is referred to as a quay or a jetty. In the United States, the term jetty refers to a solid fill structure, located on an open seacoast at the mouth of a river or tidal inlet, designed to prevent shoaling of a channel by littoral materials and to direct and confine stream or tidal flow.

For original dredging not directly related to the construction of the pier, such as channel and turning basin dredging, see category code 165-10. For utilities and services landward of the inboard end of the pier, see NAVFAC DM-25. For crane and railroad trackage on shore, see Civil Engineering and Utilities, NAVFAC DM-5. For transit sheds on piers, see category code 156-10; and for fixed crane structures, see category code 213-40.

Piers are classified according to their primary function and are described under their respective category codes.

BERTHING. Piers are used to provide either multipurpose berths or special purpose berths. Piers providing multipurpose berthing are used to service several classes of vessels so that ships will have the option of utilizing any one of several berthing facilities at a port. Berth selection depends upon the need to match available space, utilities and support services with the requirements of an incoming ship. It is not economically feasible to develop a single facility to accommodate and service all classes of vessels. Special berths are provided when berthing arrangements and/or locations are required for fueling vessels, berthing vessels carrying explosives, or for cleaning ship's bilges.

REQUIRED FEATURES. The following list gives appurtenances and facilities generally provided at piers. The facilities to be provided depend on functional requirements which often determine the classification of the pier.

1. Berths having sufficient depths and widths to allow for efficient servicing of the ship and safe vessel approach and departure.

2. Sufficient mooring devices (bollards, bitts, cleats) to safely secure vessel.
3. Access facilities for railroad cars and trucks.
4. Covered and open storage space for cargoes; fenced where required, for control of pilferage.
5. Cargo handling equipment.
6. Office space.
7. Hotel and ship service facilities.
8. Sanitary facilities.
9. Support building at the dock to house general purpose tooling and administrative areas when main shipyard complex is distant from the waterfront.
10. Fender systems.
11. Camels or struts.
12. Medical facilities.
13. Firefighting equipment.
14. Cranes and trackage.

LOCATION AND ALIGNMENT. The location and alignment of piers in a harbor should consider factors such as ease of entering and leaving berth, required quayage, harbor line restrictions, foundation conditions and isolation requirements. For further information and criteria, see Harbors, NAVFAC DM-26.1.

PIER DIMENSIONS AND CLEARANCES. The dimensions of a pier are based primarily on the lengths of the vessels, present or contemplated, that it is to accommodate. The length of the pier is dependent upon the type of ship, and the width is dependent upon the type of service to be provided. Pier measurements and allowances for single-length and multiple-length berths are based upon either accommodating known vessels or known types of vessels, where types but not specific ships are known. The dimensions for both types are determined as follows:

1. Pier Length.

- a. Single-Length Berth shall equal the overall length of the largest vessel to be accommodated, plus an allowance of 50 feet at each end of the vessel. For aircraft carriers, the allowance at each end of the vessel should be increased to 100 feet. See Figure 151-10 for berthing diagram and Table 151-10 for ship's dimensions.

- b. Multiple-Length Berths shall equal the total overall length of the largest vessels simultaneously accommodated, plus allowances of 100 feet

between vessels and 50 feet beyond outermost moored vessels. See Figure 151-10 for berthing diagram and Table 151-10 for ship's dimensions.

2. Pier and Wharf Width. The width of a pier or wharf is determined on the basis of functional requirements, space availability and site conditions such as water depths, subsurface conditions and clearances. The widths of piers and wharves, as discussed hereinafter, refer to the dimensions determined for specific function classifications. These dimensions should not be less than the widths determined by geotechnical and structural considerations. Factors to be considered in the determination of pier and wharf widths are as follows:

a. Berths Provided on Outboard Face of Pier. Because pier widths are determined on the basis of the requirements of the main berths, the outboard face of a pier may be used only for vessels whose overall length does not exceed the width of pier and where bow and stern clearances conform to established criteria.

b. Berths Provided Alongside Pier or Wharf. Total structure width depends upon size of shed, if any, type of crane service provided, number of railroad tracks and truck lanes furnished and requirements for work space and open storage areas. At wharf facilities, open storage areas are contiguous to the apron and shed, but at pier facilities open storage areas are generally located off the pier and thus do not affect the determination of total pier width. Table 151-11, indicating minimum pier widths, is furnished as a guide.

c. Berths for Carriers. Camels specifically designed to breast off aircraft carriers should be provided at designated carrier berths. Alternatively, the provision of additional pier width may be considered to provide clearances for overhangs of flight decks and sponsors.

d. Services Requiring Additional Width. Adequate width should be provided to accommodate railroad tracks, truck lanes, craneways and fuel handling equipment when furnished.

3. Slip Width.

a. General Considerations. The clear distance between piers, or slip width, should be adequate to permit the safe docking and undocking of the maximum size vessels that are to be accommodated in the slip. The size of slip should also permit the safe maneuvering and working of tugboats, barges, lighters and floating cranes. At multiple berth piers, where vessels are docked either one per berth, two abreast per berth or more, sufficient clearance should be available to permit the docking and undocking of vessels at the inboard berth without interfering with vessels at the outboard berth. Because the size of a slip is affected by docking and undocking maneuvers, consideration should be given to the advice of local pilots who are familiar with the ships to be handled and with prevailing environmental conditions such as winds, waves, swells and currents. The width should be reviewed with specific functional requirements of the individual installation before a final determination is made.

b. Minimum Width of Slip for Active Berthing.

(1) Minimum widths should be as shown on Figure 151-10. Widths are defined as a factor times the beam of the largest vessel to be accommodated. The minimum width should not be less than 300 feet. The recommended criteria are applicable only if vessels are turned outside the slip area. Refer to Table 151-10 for the beam of typical vessel types. At submarine slips, width requirements should be increased by at least four vessels beam and more, as required, to account for camels and separators, to provide for ships' vulnerability if their safety is involved, to provide for special maneuvering requirements of other ships during berthing or passing and to provide for special environmental conditions such as currents, waves and winds.

(2) The requirements discussed above apply where vessels are berthed on both sides of a slip. Where vessels are berthed on only one side of a slip, the width may be reduced.

(3) Referring to Figure 151-10, when more than 2 abreast berthing is employed, the width of slip should be increased by one ship beam for each additional ship added in order to maintain adequate clearances between moored ships during berthing and unberthing maneuvers. Thus, for 3 abreast berthing on both sides of a slip, the slip width for single berth piers would be equal to 10 times ship beam and the slip width for multiple berth piers would be equal to 11 times ship beam.

c. Minimum Width of Slip for Inactive Berthing.

(1) At slips containing inactive berths where vessels are stored for long periods of time on inactive status, in nests of two, three or more, clear distances between moored vessels and slip width may be reduced by one or two vessels beam to reflect the reduction in the frequency of berthing maneuvers and the decrease in activities of small boats and floating equipment.

4. Water Depth in Slips.

a. Minimum Depth of Water. In a sheltered harbor and where the harbor bottom consists of soft material, water depth in a slip, measured from mean low water level (M.L.W.) should be equal to the maximum loaded draft of the vessels to be accommodated plus a minimum clearance of 4 feet which includes an allowance of 1 foot for vessel trim in loading, 2 feet for underkeel clearance and an allowance of 1 foot for tidal variations. For the loaded draft of typical vessel types, refer to Table 151-10 and DM-26.6. Specified water depths should be maintained as close to the fender line of the structure as is practicable considering the accessibility of dredging equipment used during maintenance dredging operations.

b. Other Considerations. Minimum keel clearance of 4 feet should be increased if any of the following conditions prevail:

- (1) Harbor bottom consists of a hard material such as rock.
- (2) Excessive silting (one foot per year or more) occurs.

- (3) Slip area is exposed to waves, swells and winds.
- (4) Extreme low water (one foot or more) occurs.
- (5) Investigation indicates probable fouling of condensers.

c. Vessel Characteristics. Table 151-10 is a comprehensive listing of pertinent data for vessels in the Naval fleet at the time of publication. The following is a list of footnotes which applies to this table:

(1) Vessels in class were established from the hull prototype number. Two or more hull prototype numbers possessing the same or nearly the same dimensions and other characteristics were combined in the same class.

(2) Ordinarily, extreme breadth is the maximum width of vessel. For submarines, the value given is the maximum diameter or width of the hull structure and is not necessarily the maximum width which may occur at the horizontal stabilizer planes and is so noted. Canted aircraft carrier flight decks may not be dimensionally symmetrical about the longitudinal centerline of the vessel, marking the extreme breadth value for aircraft carriers unsuitable for determining berthing camel width at piers and wharves with gantry crane service.

(3) Maximum navigational draft is the minimum depth of water required to prevent grounding of a vessel due to appendages projecting below the vessel's base line or keel. Such appendages may be sonar domes, propellers, rudders, hydrofoils, vertical submarine control planes, etc. Many vessels also possess a decided trim to the bow or stern in fully loaded condition or in the case of submarines, a trim to the stern in surfaced condition.

151 10 AMMUNITION PIER (FB)

Ammunition piers are designed for use in the receipt of ammunition for storage and for the outloading of ammunition onto barges and ships. In many cases outgoing ammunition is first loaded from the ammunition pier onto barges for transfer to ships moored offshore or in a roadstead. The services and facilities provided for ammunition piers include lighting, telephone and fire alarm systems, and salt water for firefighting. Railroad tracks are normally provided unless the established method of handling ammunition is by truck. Freshwater is provided if a supply is readily available. For dimensional and other pertinent information, see Code 151. For quantity-distant standards for pier and wharf facilities handling explosives and ammunition, see NAVORD OP-5, Volume 1, Chapter 15. This pier is for break bulk load/off-load of ammunition. For containerized load/off-load of ammunition, use Category Code 151 70, Ordnance Container Handling Pier.

TABLE 151-10

Ship Characteristics

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
AD	14,15,17-19	DESTROYER TENDER	531.0	73.0	73.0	AD 14,19-26.0; AD 15-28.0; AD 17,18-29.0
AD	24,26,36	SAME	492.0	70.0	70.0	AD 24,29.0; AD 26,36-28.0
AD	37,38	SAME	645.0	85.0	85.0	30.0
AD	41-44	SAME	643.0	85.0	85.0	AD-41,24.0;AD-42, 23.0;
AE	21-25	AMMUNITION SHIP	511.0	72.0	72.0	AE 21,23,25- 29.0;AE 22-34.0; AE 24-32.0
AE	26-29,32-35	SAME	564.0	81.0	81.0	AE 35-28.0; AE 28,29-30.0; AE 32,33-30.0; AE 26,27,34-31.0
AF	58	STORE SHIP	502.0	72.0	72.0	27.3
AFS	1-7	COMBAT STORE SHIP	581.0	79.0	79.0	28.0
AG	153,154	MISCELLANEOUS	564.0	76.0	76.0	28.0
AG	164	SAME	455.0	66.0	66.0	24.3
AGDS	2	AUXILLIARY DEEP SUBMERGENCE SUPPORT SHIP	466.0	74.0	72.0	24.1

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
AGER	2	ENVIRONMENTAL RESEARCH	177.0	32.0	32.0	10.0
AGF	3	MIS COMMAND SHIP	522.0	100.0	84.0	23.0
AGFF	1	FRIGATE RESEARCH SHIP	416.0	44.0	43.0	24.0
AGM	8	MISSILE RANGE INSTRUMENTATION SHIP	455.0	62.0	62.0	--
AGM	9,10	SAME	520.0	72.0	72.0	--
AGM	19,20	SAME	595.0	75.0	75.0	30.5
AGM	22	SAME	455.0	62.0	62.0	27.0
AGM	23	SAME	564.0	76.0	76.0	28.0
AGOR	7,12,13	OCEANOGRAPHIC RESEARCH	209.0	40.0	39.0	20.0
AGOR	11	SAME	266.0	52.0	51.0	20.8
AGOR	16	SAME	246.0	75.0	75.0	22.9
AGOS	1-3	OCEAN SURVEILLANCE SHIP	--	--	--	--
AGS	21,22	SURVEYING SHIP	455.0	62.0	62.0	28.2

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Ship Characteristics
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VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
AGS	26,27,33,34,38	SURVEYING SHIP	285.0	48.0	48.0	18.8
AGS	29,32	SAME	394.0	54.0	54.0	16.0
AGSS	555	AUXILIARY SUBMARINE	165.0	18.0	16.0	17.9
AGSS	569	SAME	205.0	27.0	25.0	22.0
AH	17	HOSPITAL SHIP	519.0	72.0	72.0	26.0
AK	237,240,242, 254,274	CARGO SHIP	455.0	62.0	62.0	29.0
AK	255,267	SAME	520.0	72.0	72.0	33.0
AK	271	SAME	266.0	52.0	51.0	--
AK	277	SAME	478.0	66.0	66.0	30.0
AK	280-283	SAME	459.0	63.0	63.0	28.5
AKR	7	VEHICLE CARGO SHIP	499.0	78.0	78.0	27.1
AKR	9	SAME	540.0	83.0	83.0	29.1
AO	57,62	OILER	553.0	75.0	75.0	34.0
AO	51,98,99	SAME	644.0	75.0	75.0	39.0
AO	105-109	SAME	664.0	75.0	75.0	35.8

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VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
AO	143-148	VEHICLE CARGO SHIP	655.0	86.0	86.0	36.7 NAV. DRAFT 40.0 FT FOR AO 146 & 148
AO	177-180,186	SAME	592.0	88.0	88.0	--
AOE	1-4	FAST COMBAT SUPPORT SHIP	796.0	107.0	107.0	41.0
AOG	58	GASOLINE TANKER	311.0	49.0	49.0	16.0
AOG	77-79	SAME	325.0	48.0	48.0	19.0
AOG	81,82	SAME	302.0	61.0	61.0	22.2
AOR	1-7	REPLENISHMENT OILER	659.0	96.0	96.0	36.5 AOR 6 ONLY-39.0
AOT	50,67,73,75, 76,78,134	TRANSPORT OILER	524.0	68.0	68.0	30.0 AOT 50 ONLY-33.0
AOT	149,151,152	SAME	620.0	84.0	84.0	33.6
AOT	165	SAME	615.0	80.0	80.0	36.0
AOT	168-176	SAME	587.0	84.0	84.0	34.5
AOT	181	SAME	620.0	84.0	84.0	33.7
AOT	182-185	SAME	672.0	89.0	89.0	36.2

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Ship Characteristics
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VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
AP	110-117,119	TRANSPORT	623.0	76.0	76.0	26.0
AP	122,123,125-127	SAME	609.0	76.0	76.0	29.1
AP	197,198	SAME	534.0	73.0	73.0	27.0
APL	2,4,5,15,18,19, 29,31,32,34,42, 43,47,50,53,54, 57,58	BARRACKS CRAFT NSP	261.0	49.0	49.0	11.0
AR	5-8	REPAIR SHIP	530.0	73.0	73.0	26.0 AR 7 ONLY 28.0
ARC	2,6	CABLE REPAIRING SHIP	374.0	47.0	47.0	29.4
ARC	3	SAME	439.0	58.0	58.0	18.6
ARC	7	SAME	--	--	--	--
ARL	24	LANDING CRAFT REPAIR SHIP	328.0	50.0	50.0	14.0
ARS	6,8,21,38-43	SALVAGE SHIP	214.0	43.0	43.0	15.1
AS	11,12,15-18	SUBMARINE TENDER	531.0	73.0	73.0	26.0
AS	19	SAME	574.0	73.0	73.0	26.0
AS	31,32	SAME	599.0	83.0	83.0	27.0

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VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS EXTREME	IN FEET (2) AT LOADED WATERLINE	DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
AS	33,34	SUBMARINE TENDER	644.0	85.0	85.0	30.0
AS	36,37	SAME	644.0	85.0	85.0	30.0
AS	39-41	SAME	644.0	85.0	85.0	30.0
ASR	9,13-15	SUBMARINE RESCUE SHIP	252.0	44.0	42.0	ASR 9&13 20.0 ASR 14, 17.0 & ASR 15, 23.0
ASR	21,22	SAME	251.0	93.0	86.0	24.9
ATA	181,193,213	AUXILIARY OCEAN TUG	143.0	34.0	34.0	15.0
ATF	76,85,91,105, 110,113,149, 158-160 & 162	FLEET OCEAN TUG	205.0	39.0	39.0	18.0
ATF	166-172	SAME	--	--	--	--
ATS	1-3	SALVAGE & RESCUE TUG	283.0	50.0	50.0	18.0
AVM	1	GUIDED MISSILE SHIP	540.0	72.0	71.0	27.3
AVT	16	AUXILIARY AIRCRAFT TRANSPORT	910.0	189.0	103.0	31.0
BB	61-64	BATTLESHIP	888.0	109.0	108.0	38.0

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VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
CA	134,139	HEAVY CRUISER	717.0	77.0	75.0	26.0
CG	10,11	GUIDED MISSILE CRUISER	675.0	71.0	69.0	30.0
CG	16-24	SAME	533.0	55.0	54.0	26.0
CG	26-34		547.0	55.0	54.0	CG27 27.5; CG 28, 33 & 34, 28.5; CG 29-32, 29.5 & CG 26, 30.5
CG	47,48	SAME	--	--	--	--
CGN	9	GUIDED MISSILE CRUISER NUCLEAR	721.0	73.0	72.0	31.0
CGN	25	SAME	565.0	58.0	57.0	26.0
CGN	35	SAME	564.0	58.0	57.0	30.5
CGN	36,37	SAME	596.0	61.0	60.0	31.0
CGN	38-41	SAME	586.0	63.0	61.0	32.6
CV	34	AIRCRAFT CARRIER	911.0	107.0	103.0	33.0
CV	41,43	SAME	1001.0	CV 41 183.0 CV 43 156.0	121.0	36.0

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Ship Characteristics
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VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
CV	59-62	AIRCRAFT CARRIER	1040.0	CV 59 & 60 253.0 CV 62 263.0 & CV 61 270.0	130.0	--
CV	63,64,66	SAME	1048- 1073	CV 66 252.0; CV 63 & 64 282.0	130.0	CV 63,37.0; CV 64,40.0 & CV 66,38.0.
CV	67	SAME	1073.0	252.0	130.0	37.0
CVA	31	ATTACK AIRCRAFT CARRIER	872.0	172.0	103.0	31.0
CVN	65	AIRCRAFT CARRIER NUCLEAR PROPULSION	1088.0	248.0	133.0	39.0
CVN	68-71	SAME	1088- 1115	CVN 68 257.0, CVN 69 252.0 & CVN 70	134.0	CVN 68,41.0; CVN 69,39.0 & CVN 70,
CVS	11,12,20,38	ASW AIRCRAFT	889-899	172.0	103.0 CV 12 & 20 ONLY 101.0	31.0
DD	743,763,784, 785,817,821, 822,825,827, 842,862-864, 866,871,873, 876,880,883, 886	DESTROYER	391.0	41.0	40.0	19.0-22.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
DD	931,942,944- 946,948,950, 951	DESTROYER	418.0	45.0	44.0	21.0
DD	933,937,938, 940,941,943	SAME	418.0 DD933 ONLY 424 FT.	45.0	44.0	20.0 DD933 ONLY 22 FT.
DD	963-992,997	SAME	564.0	55.0	55.0	30.0
DDG	2-24	GUIDED MISSILE DESTROYER	437.0	47.0	46.0	ALL 21.0 EXCEPT DDG 8,12,17,19 22.0; DDG 4,5,7, 23.0; DDG 2,3,10 24.0; DDG 6,20 25.0
DDG	31-34	SAME	418.0	45.0	44.0	22.0 EXCEPT DDG 34,23.0
DDG	37-46	SAME	513.0	52.0 EXCEPT DDG 37 & 46, 53.0.	52.0	ALL 25.0 EXCEPT DDG 37,27.0.
DDG	47	SAME	568.0	55.0	55.0	31.6
DDG	993-996,	SAME	--	--	--	--
FF	1037,1038	FRIGATE	372.0	41.5	41.0	24.0
FF	1040,1041,1043- 1045,1047-1051	SAME	415.0	44.0	44.0	ALL 24.0 EXCEPT FF 1045,1047,1049, 25.0; FF 1041 26.0

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Ship Characteristics
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VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
FF	1052-1097	FRIGATE	438.0	47.0	47.0	ALL 26.5 EXCEPT FF 1054,27.5
FF	1098	SAME	416.0	44.0	43.0	24.0
FFG	1-6	GUIDED MISSILE FRIGATE	415.0	44.0	44.0	26.0
FFG	7-49	SAME	445.0	47.0	38.0	24.9
LCC	19,20	AMPHIBIOUS COMMAND SHIP	620.0	LCC 19,108.0; LCC 20 102.0	82.0	30.0
LHA	1-5	AMPHIBIOUS ASSAULT SHIP GENERAL PURPOSE	820.0	118.0	106.0	26.0
LKA	112	AMPHIBIOUS CARGO SHIP	564.0	76.0	76.0	28.0
LKA	113-117	SAME	576.0	82.0	82.0	28.0
LPA	249	AMPHIBIOUS TRANSPORT	564.0	76.0	76.0	28.0
LPD	1-2	AMPHIBIOUS TRANSPORT DOCK	522.0	100.0	84.0	LPD 1,23.0; LPD 2,25.0
LPD	4-15	SAME	570.0	LPD 12-14,100; LPD 4,105.0; LPD 5-8,10,11, 15,108.0; LPD 9,115.0	84.0	ALL 23.0 EXCEPT LPD 9,27.0; LPD 6,29.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
LPH	2,3,7,9-12	AMPHIBIOUS ASSAULT SHIP	592-602	84.0	84.0	ALL 30.0; EXCEPT LPH 10,28.0; LPH 2,9,29.0; LPH 3,31.0
LSD	28-35	DOCK LANDING SHIP	510.0	ALL 84.0 EXCEPT LSD 28, 90.0	84.0	ALL 19.0 EXCEPT LSD 28 20.0
LSD	36-40		553-562	84.0	84.0	20.0
LST	1173,1177,1178	TANK LANDING SHIP	445.0	62.0	62.0	18.0
LST	1179-1198	SAME	565.0	70.0	70.0	ALL 20.0 EXCEPT LST 1198 21.0
MSO	427,428-431, 433,437-443, 446,448,449, 455,456,464, 488,489,490, 492,509,511	MINESWEEPER OCEAN NONMAGNETIC	173.0	35.0	35.0	12.0- 14.0
PG	92,93,99,101	PATROL COMBATANT	165.0	24.0	22.0	10.0
PHM	1-6	PATROL COMBATANT MISSILE HYDROFOIL	147.0	29.0	25.0	24.0
			WITH FOILS RAISED			
SS	565	SUBMARINE	293.0	27.0	24.0	17.3
SS	574	SAME	334.0	30.0	25.0	19.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
SS	576	SUBMARINE	283.0	27.0	25.0	17.3
SS	580-582	SAME	219.0	29.0	27.0	25.1
SSAG	567	AUXILIARY SUBMARINE	293.0	27.0	24.0	17.3
SSBN	598-602	FLEET BALLISTIC MISSILE SUBMARINE NUCLEAR	382.0	33.0	25.0	29.0
SSBN	608-611, 618	SAME	411.0	33.0, 40.5 BREADTH AT STERN PLANES	26.5	31.1
SSBN	616, 617, 619, 620, 622-636, 640-645, 654- 659	SAME	421.0	33.0, 41.0 BREADTH AT STERN PLANES	25.0	32.0
SSBN	726-733	SAME	559.3	42.0	30.0	36.3
SSN	571	SUBMARINE NUCLEAR	324.0	28.0	23.0	25.9
SSN	575	SAME	376.0	28.0	22.0	23.8
SSN	578, 579, 583, 584	SAME	263.0	25.0	20.0	21.4
SSN	585	SAME	249.0	32.0	28.0	28.2
SSN	586	SAME	448.0	37.0	34.0	24.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
SSN	587	SUBMARINE NUCLEAR	350.0	26.0	24.0	21.0
SSN	588, 590-592	SAME	249.0	32.0	25.0	27.7
SSN	594-596, 603- 607, 612-615, 621	SAME	279-297	32.0	27.0	29.0
SSN	597	SAME	273	23.0	19.0	21.0
SSN	637-639, 646- 653, 660-670, 672-684, 686, 687	SAME	289-303	32.0 41.0 BREADTH AT STERN PLANES	25.0	ALL 29.0 EXCEPT SSN 661, 30.0; SSN 672-684 & 686, 687, 26.0
SSN	671	SAME	315.0	33.0 42.5 BREADTH AT PUFF BLISTERS ON STABILIZERS	25.0	30.5
SSN	685	SAME	365.0	32.0 42.0 BREADTH AT STERN PLANES	25.0	30.9
SSN	688-722	SAME	361.0	33.0 40.0 BREADTH AT STERN PLANES	29.0	30.5
DSRV	1,2	DEEP SUBMERGENCE RESCUE VESSEL	49.0	8.0	--	THIS VESSEL IS NOT MOORED AS IT IS STOWED ABOARD ANOTHER VESSEL

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
DSV	1-5	DEEP SUBMERGENCE	83.0 DIMENSIONS INDICATED ARE FOR DSV 1 ONLY DSV 2-5 ARE MUCH SMALLER VEHICLES (22.5 to 25.0 FT. LONG	18.0	10.0	20.0
1X	306-308, 310	UNCLASSIFIED MISCELLANEOUS	177.0	32.0	32.0	11.0
1X	501	SAME	250.0	66.0	51.0	13.8
1X	502-504	SAME	328.0	50.0	50.0	14.0
1X	506, 507	SAME	125.0	36.0	--	--
NR	1	SUBMERSIBLE RE- SEARCH VEHICLE	136.0	16.0	16.0	15.1
YAG	61	MISCELLANEOUS AUXILIARY	194.0	33.0	33.0	16.0 DRAFTS ESTIMATED FROM SHIP'S PLANS

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YC	306,360,699, 705,709,712, 713,721,724, 725,728,752, 754,756,757, 760,764,769, 772,775,781, 783,787,789, 813,821,823- 826,828-833, 972,979,980, 983,984,1056, 1058-1060,1062, 1065,1068-1071, 1073-1077,1080, 1081,1084-1092, 1107,1112,1116- 1121,1366-1368, 1371-1373,1375- 1383,1385,1386, 1394,1395,1399, 1408-1411,1419, 1446	OPEN LIGHTER	110.0	35.0	34.0	8.0
YC	688,746,794, 799,800,802- 805,1406,1407, 1413,1417	SAME	110.0	31.0	30.0	4.0
YC	695	SAME	140.0	50.0	49.0	---
YC	981,983,984	SAME	142.0	40.0	39.0	7.0

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Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YC	1027,1029	OPEN LIGHTER	150.0	40.0	39.0	7.0
YC	1273,1275	SAME	100.0	40.0	39.0	6.0
YC	1321,1323, 1324,1327, 1328	SAME	125.0	34.0	33.0	6.0
YC	1333,1334	SAME	112.0	53.0	48.0	6.0
YC	1351,1352, 1360,1400- 1402	SAME	81.0	27.0	26.0	4.0
YC	1389,1391	SAME	160.0	51.0	50.0	8.0
YC	1430-1434, 1435,1438- 1440,1442- 1445,1450, 1458,1461, 1464-1468	SAME	120.0	33.0	33.0	8.0
YC	1469-1497, 1499,1500- 1504	SAME	110.0	32.0	32.0	8.0
YC	1447-1449	SAME	130.0	30.0	30.0	6.0
YC	1451	SAME	--	--	--	--

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YC	1509-1515	OPEN LIGHTER	--	--	--	--
YC	1523-1545	SAME	--	--	--	--
YCF	16	CAR FLOAT	150.0	34.0	34.0	4.0
YCV	8-11,15,16	AIRCRAFT TRANSPORTATION LIGHTER	200.0	65.0	65.0	8.0
YDT	10	DIVING TENDER	81.0	27.0	26.0	3.0
YDT	14,15	SAME	133.0	31.0	30.0	8.0
YDT	16	SAME	261.0	48.0	48.0	--
YF	862,866,885	COVERED LIGHTER	133.0	31.0	30.0	10.0
YFB	83	FERRYBOAT OR LAUNCH	180.0	46.0	45.0	--
YFB	87-91	SAME	162.0	59.0	45.0	--
UFN	260,262,263, 266,274,276, 278,279,283, 284,299,305- 308,640-642, 644-652,654, 656-659,691, 692,694,697, 704,705,707, 717,792-798,	COVERED LIGHTER NSP	110.0	35.0	34.0	8.0

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Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
	800-803,806, 814-816,818, 820,821,901, 902,905-907, 910-911,917, 934,941,945, 946,949,952- 956,958,959, 962-966,968, 970,972,973, 978-981,983, 984,988,991, 992,1154-1156, 1158,1159,1163	COVERED LIGHTER NSP				
YFN	272,311,313, 362,364,367- 372,375,413, 414,540,1178, 1180,1183,1187- 1190,1195	SAME	110.0	31.0	30.0	--
YFN	1126,1128-1130	SAME	126.0	34.0	34.0	6.0
YFN	1173-1177,1191, 1194,1196-1200, 1202-1206,1208, 1211-1214,1217- 1223,1239-1243, 1250-1253	SAME	110.0	34.0	34.0	8.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YFN	1237,1238	COVERED LIGHTER NSP	127.0	35.0	35.0	7.0
YFNB	4-6,8,13,19, 25,30-32,34- 37,39,41,42	LARGE COVERED LIGHTER	261.0	48.0	48.0	9.5
YFND	5,27,29	DRYDOCK COMPANION CRAFT	111.0	34.0	34.0	8.0
YFNX	4	LIGHTER SPECIAL PURPOSE	110.0	35.0	34.0	8.0
YFNX	7	SAME	--	--	--	--
YFNX	15	SAME	--	--	--	--
YFNX	19	SAME	110.0	35.0	34.0	7.0
YFNX	20	SAME	110.0	31.0	30.0	4.0
YFNX	22-26,30-34	LIGHTER SPECIAL PURPOSE	110-126	32-34	32-34	4.0-8.0
YFP	3,11,12,14	FLOATING POWER BARGE	110.0	32-34	32-34	7.0-8.0
YFR	888,890	REFRIGERATED COVERED LIGHTER SP	133.0	30.0	30.0	10.0
YFND	5,27,29					

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YFRN	385,412,997, 1235,1256,1257	REFRIGERATED COVERED LIGHTER SP	150-153	35.0	34.0	7.0-10.0
YFRT	287,418,451, 520,522,523	COVERED LIGHTER SP	133.0	30.0	30.0	9.0
YFU	50	HARBOR UTILITY CRAFT	119.0	35.0	34.0	6.0
YFU	71-77,79,81,83	SAME	125.0	36.0	--	--
YFU	91,94,97,98, 100-102	SAME	--	--	--	--
YGN	69,70,73	GARBAGE LIGHTER NSP	120.0	35.0	34.0	9.0
YGN	80-83	SAME	124.0	35.0	35.0	--
YHLC	1,2	SALVAGE LIFT CRAFT, HEAVY	124.0	35.0	35.0	--
YNG	11,17	GATE CRAFT	110.0	34.0	34.0	4.0
YO	47	FUEL OIL BARGE SP	235.0	37.0	37.0	15.0
YO	106,129,171, 174,194,200, 202,203,220, 223-225,228, 230,241,257, 264	SAME	174.0	33.0	32.0	13.0

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Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YO	153	FUEL OIL BARGE SP	156.0	30.0	30.0	12.0
YOG	58,68,78,79, 87,88,93,196	GASOLINE BARGE SP	174.0	33.0	32.0	13.0
YOGN	8-10,26	GASOLINE BARGE NSP	165.0	35.0	35.0	8.0
YOGN	110,111,113-115, 122-125	SAME	165.0	42.0	42.0	8.0
YON	1,2	FUEL OIL BARGE NSP	87.0	28.0	27.0	7.0
YON	80,81,84-88	SAME	174.0	40.0	39.0	8.0
YON	90,91,96-98, 100-102,235	SAME	165.0	35.0	35.0	8.0
YON	239	SAME	100.0	40.0	40.0	7.0
YON	255,256	SAME	120.0	33.0	--	--
YON	258,260-262, 265,269,271- 275,280-295	SAME	165.0	40.0	40.0	8.0
YON	305,306	SAME	--	--	--	--
YOS	8,10-12,15-17,	OIL STORAGE BARGE	80.0	34.0	32.0	5.0
YOS	21,23,24,28,33	SAME	110.0	34.0	34.0	9.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YOS	34	FUEL OIL BARGE	--	--	--	--
YP	654-672	PATROL CRAFT	81.0	18.0	17.0	5.0
YP	673-675	PATROL CRAFT	--	--	--	--
YPD	32, 37, 41, 42, 46	FLOATING PILE DRIVER	104-111	31-46	31-46	8.0
YR	9	FLOATING WORKSHOP	261.0	48.0	48.0	9.0
YR	25-27, 29, 35, 36, 38, 44, 46, 59, 60, 63-65, 67, 68, 70, 73, 76-78	SAME	153.0	36.0	34.0	6.0
YR	50	SAME	153.0	43.0	42.0	6.0
YR	83, 84, 85	SAME	111.0	31.0	31.0	4.0
YRB	1, 2	REPAIR & BERTHING BARGE	111.0	30.0	30.0	4.0
YRB	22, 25	SAME	110.0	34.0	34.0	4.0
YRBM	1-6, 8, 9, 11-15	REPAIR, BERTHING & MESSING BARGE NSP	110-112	36.0	34.0	4.0
YRBM	31-36	SAME	--	--	--	--
YRBM	20	SAME	261.0	48.0	48.0	9.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YRBM	23-30	REPAIR, BERTHING & MESSING BARGE. NSP	146.0	46.0	46.0	4.0
YRDH	1,6,7	FLOATING DRYDOCK WORKSHOP HULL	150.0	--	34.0	6.0
YRDH	2	SAME	--	--	--	--
YRDM	1,2,5,7	FLOATING DRYDOCK WORKSHOP MACHINERY	150.0	--	34.0	6.0
YRR	1	RADIOLOGICAL REPAIR BARGE	150.0	43.0	42.0	7.0
YRR	2,5-14	SAME	150-153	36.0	34.0	6.0
YRR	3	SAME	110.0	35.0	34.0	8.0
YRR	4	SAME	150.0	32.0	32.0	4.0
YRST	1,2	SALVAGE CRAFT TENDER NSP	261.0	48.0	48.0	9.0
YRST	3,6	SAME	110.0	35.0	34.0	4.0-6.0
YRST	5	SAME	124.0	61.0	--	4.0
YSD	15,39,53,63, 74,77	SEAPLANE WRECKING DERRICK	104.0	31.0	30.0	4.0
YSR	4,6,7	SLUDGE REMOVAL BARGE	95.0	31.0	30.0	7.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YSR	11,17-20,23, 27-29	SLUDGE REMOVAL BARGE	80.0	32.0	32.0	5.0
YSR	25,26	SAME	94.0	30.0	30.0	7.0
YSR	30-33,37,38-40, 45	SAME	110.0	34.0	34.0	9.0
YTB	752,753,756- 759,762-771, 774-836	LARGE HARBOR TUG	101-109	29-31	25-31	14.0-16.0
YTB	760,761	SAME	85.0	24.0	23.0	11.0
YTL	422,434,438, 439,550,583, 588,591,594, 602	SMALL HARBOR TUG	66.0	18.0	17.0	8.0
YTM	146,149,151, 176,178,180, 189,252,265, 268,359,364, 366,380-383, 391-395,397- 400,403-406, 413,415,417, 496,521-524, 526,527,534, 536,542-549, 701-702,704	MEDIUM HARBOR TUG	100-102	24-28	24-25	10.0-11.0

Ship Characteristics
(Continued)

VESSEL DESIG- NATION	VESSELS IN CLASS (1)	TYPE OF VESSEL	OVERALL LENGTH IN FEET	BREADTHS IN FEET (2)		DRAFTS IN FEET (3) MAXIMUM NAVIGATIONAL
				EXTREME	AT LOADED WATERLINE	
YTM	748,768,770, 776,777,779	MEDIUM HARBOR TUG	101-107	27-28	25.0	12.0
YTM	760,761	SAME	85.0	24.0	23.0	--
YW	83,86,98,101, 108,113,119, 123,126-128	WATER BARGE SP	174.0	33.0	32.0	13.0
YWN	70,71,78,79, 82	SAME	165.0	35.0	35.0	8.0
YWN	147	SAME	86.0	20.0	--	7.0
YWN	156	SAME	120.0	33.0	--	--

Floating Drydock Characteristics

DOCK DESIG- NATION	DOCKS IN CLASS	TYPE OF DOCK	LENGTHS IN FEET OVERALL INCLUDING OUT RIGGERS	BREADTHS IN FEET EXTREME	MAXIMUM SUB- MERSION	DRAFTS IN FEET LIGHT
AFDB	1	LARGE AUXILIARY FLOATING DRYDOCK	512.0	256.0	78.0	9.0
AFDB	2	SAME	927.0	256.0	78.0	9.0
AFDB	3	SAME	843.0	256.0	78.0	9.0
AFDB	4,5	SAME	825.0	240.0	67.3	8.7
AFDB	7	SAME	513.0	240.0	67.3	8.7
AFDL	1,2,6,8-12,15, 16,19,21,23,25, 29	SMALL AUXILIARY FLOATING DRYDOCK	200.0	64.0	28.5	3.4
AFDL	7,22,23	SAME	288.0	64.0	31.3	3.2
AFDL	37,38,40,41,44, 45	SAME	389.0	84.0	38.5	10.0
AFDL	47	SAME	489.7	97.0	42.3	4.2
AFDL	48	SAME	400.0	96.0	46.8	13.4
AFDM	1,2	MEDIUM AUXILIARY FLOATING DRYDOCK	614.0	116.0	50.4	5.8
AFDM	3,5-10	SAME	622.0	124.0	50.4- 52.8	5.8- 6.2
ARD	5,7,8	AUXILIARY REPAIR DRYDOCK	482.6	71.0	32.6	5.3

Floating Drydock Characteristics
(continued)

DOCK DESIG- NATION	DOCKS IN CLASS	TYPE OF DOCK	LENGTHS IN FEET OVERALL INCLUDING OUT RIGGERS	BREADTHS IN FEET EXTREME	MAXIMUM SUB- MERGENCE	DRAFTS IN FEET LIGHT
ARD- ARDM	ARD 12,30,32; ARDM-1,2	AUXILIARY REPAIR DRYDOCK	488.6	81.0	32.8	5.7
ARDM	3	MEDIUM AUX. REPAIR DRYDOCK	512.6	81.0	41.3	7.2
ARDM	4	SAME	492.0	96.0	54.5	6.0
YFD	8	YARD FLOATING DRYDOCK	657.3	132.5	49.7	8.3
YFD	23	SAME	542.0	114.0	45.8	7.8
YFD	54	SAME	412.0	90.0	37.0	6.8
YFD	68-71	SAME	598.0	118.0	45.8	5.7
YFD	83	SAME	200.0	64.0	28.5	3.4

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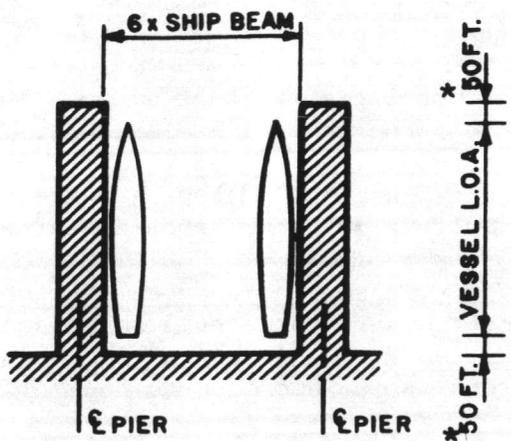
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TABLE 151-11
Typical Pier and Wharf Widths

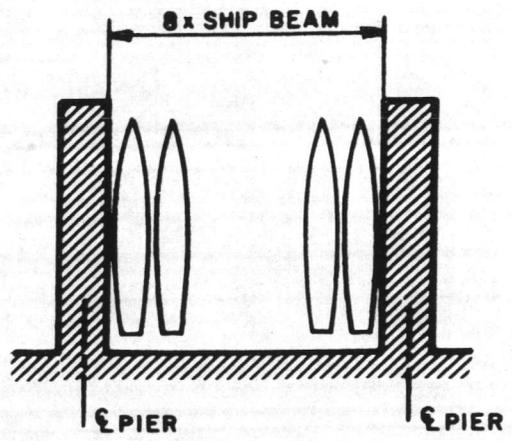
Function Classification	Vessel Type	Minimum Pier Width (Feet)	Minimum Wharf Apron Width (Feet)	Railroad Tracks (Standard Gage)	Rail-mounted Cranes
1. Ammunition	Ammunition	100	100	-	-
2. Berthing	Aircraft Carrier	100*	-	-	-
3. Berthing	Cruiser	80	-	-	-
	Destroyer	80	-	-	-
	Frigate	80	-	-	-
	Submarine	60	-	-	-
	Auxiliary	80	-	-	-
4. Fitting-Out	Destroyer	100	-	2 Tracks 1 Each Side	2 30 ft. Gage, 1 Each Side
5. Repair	Cruiser	125	-	4 Tracks, 2 Each Side	2 30 ft. Gage, 1 Each Side
	Auxiliary	125	-	4 Tracks, 2 Each Side	2 30 ft. Gage, 1 Each Side
6. Fueling	Auxiliary	50	-	-	-
7. Supply (General Cargo)	Auxiliary	125 plus shed width	60	2 Tracks	-
8. Supply (Container Cargo)	Auxiliary	80	80	Up to 3 Tracks	1 50 ft. Gage

*Width applies when 60 foot camels are used to breast out carriers.

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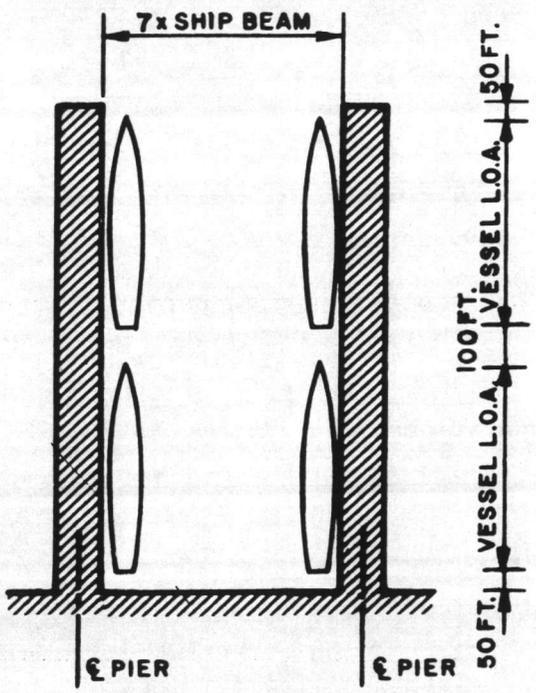


SINGLE BERTHING

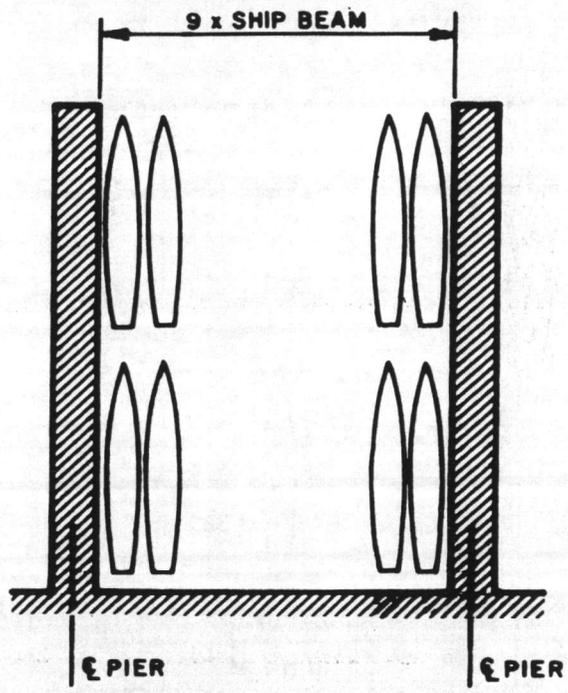


TWO-ABREAST BERTHING

* 100 FT. FOR AIRCRAFT CARRIERS
SINGLE BERTH PIERS



SINGLE BERTHING



TWO-ABREAST BERTHING

MULTIPLE BERTH PIERS

FIGURE 151-10
Slip Widths

151 20 GENERAL PURPOSE/BERTHING PIER (FB)

Berthing piers are used primarily for mooring ships that do not require piers equipped with shipyard facilities. Berthing piers are classified as active or inactive. The active berthing piers are used when ships are berthed for a relatively short time; the inactive classes are used when ships are to be tied up for long periods in a decommissioned status.

When berthing for carriers is to be provided on one side only or on both sides of a berthing pier the width of the structure shall be adequate to provide clearance for the overhang of the flight decks and sponsors. Alternatively, camels or other separators may be provided to fend off carriers.

All piers regardless of their function, will include such appurtenances as protective dolphins, fender systems, and dredging in connection with the facility. Supporting utilities, crane/railroad trackage, fixed cranes, and transit sheds on piers will carry their appropriate category codes. For a typical berthing pier, see Definitive Designs, NAVFAC P-272. For other pertinent information, see Code 151 (general notes).

For design criteria see Waterfront Operational Facilities, NAVFAC DM-25.

151 30 FITTING-OUT PIER (FB)

Piers for fitting-out are very similar to those used for repair purposes, providing approximately the same facilities. However, fitting-out piers will have, in addition to light and heavy gantry cranes, a large fixed-tower crane for handling guns, turrets, engines, and heavy armor. The area around this facility must be of sufficient size to permit other equipment to maneuver and operate. This may vary depending on station mission. For dimensional and other pertinent information, see Code 151.

For design criteria see Waterfront Operational Facilities, NAVFAC DM-25.

151 40 FUELING PIER (FB)

Facilities for berthing ships while discharging fuel to storage or receiving fuel from storage are provided at fueling piers. Such piers will provide salt water for firefighting, freshwater, steam in cold climates, electric power, and telephone and fire alarm facilities. In addition, a fuel main and special protective hose racks and small derricks for handling fuel hoses are necessary. They shall also be equipped with pipelines for each type of fuel to be stored at the site, including bilge and ballast lines. Stripper pumps for emptying lines are also necessary. A fueling pier may be justified for those stations where bulk quantities of liquid fuel can be economically handled by water transportation. These piers vary according to the service required, the local exposure to wind and water, and the geologic formation of the site. For dimensional and other pertinent information, see Code 151.

For design criteria see Waterfront Operational Facilities, NAVFAC DM-25.

151 50 REPAIR PIER (FB)

Repair piers are constructed and equipped to permit overhaul of those portions of a vessel above the waterline. These structures will normally be equipped with a gantry crane and standard-gage railroad tracks and have facilities to provide salt and freshwater, steam, compressed air, telephone and fire alarm service, and electric power for ship service, lighting, and welding. In some cases industrial gases may be provided.

For typical repair pier see Definitive Designs, NAVFAC P-272. For dimensional and other pertinent information see Code 151.

For design criteria see Waterfront Operational Facilities, NAVFAC DM-25.

151 60 SUPPLY PIER (FB)

Supply piers accommodate berthing for the transfer of materials between ship and shore. A large building or transit shed normally occupies the central portion of a supply pier. The pier width will be in direct ratio to the width of the shed or sheds, placed longitudinally down the center of the pier. For example, the shed for a ship needing 600 feet of berthing space is 150 feet wide. Transit sheds are normally placed side by side parallel with the long axis of the pier when both sides of a pier are used for shipments. The pier width should then be from 380 to 420 feet because the pier deck or apron should be from 40 to 60 feet wide to accommodate railroad track, dock truck trains and allow proper cargo handling. Space restrictions at some seacoast installations will undoubtedly dictate the construction of piers of lesser width. In such cases, transit sheds must be designed with these restrictions. Planning for supply piers at installations will usually be restricted to industrial seaport locations having a primary stock point mission. For dimensional and other pertinent information relative to supply piers other than that in the preceding paragraph, see Code 151.

For design criteria see Waterfront Operational Facilities, NAVFAC DM-25; Supply Facilities, NAVFAC DM-32.

151 70 ORDNANCE CONTAINER HANDLING PIER (FB)

An ordnance container handling pier is used primarily for the outloading and receiving of explosive ordnance in containers from non-self-sustaining container ships. This does not preclude use of the pier by conventional break-bulk or self-sustaining container ships. The pier should be sited in accordance with NAVSEA OP-5, Volume I. The services and facilities provided on the pier are lighting, telephones, fire alarms, and salt water for fire fighting. Railroad tracks are provided where the normal method of drilling containers to the pier is by Trailer on Flat Car or Container on Flat Car (TOFC/COFC). Rails are flush with pier deck surface for ease of operations when moving containers by trucks on the pier. For dimensional and other pertinent data, see Code 151 (general notes) and NAVFAC DM-25.

151 71 DEGAUSSING PIER (FB)

No criteria are currently available for this code.

151 80 DEPERMING PIER (FB)

No criteria are currently available for this code.